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⑤④ **Apparatus for making micro-abrasions, particularly on human tissue and on adherent and non-transpiring bodies in general.**

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## Description

The present invention relates in general to apparatus for making micro-abrasions, particularly for cosmetic and/or therapeutic treatment of human tissue (the removal of scars and stretch marks), as well as for the treatment of hides and similar adherent and non-transpiring materials.

More particularly, the invention is concerned with apparatus of the type including a handle having an inlet passage and an outlet passage which communicate with an aperture provided in the handle and intended to be positioned on the surface to be treated, and means for the metered supply of reducing substances in a pneumatic carrier to the aperture of the handle. Such apparatus is known from US-A-1 752 664.

The object of the present invention is to produce apparatus of the type defined above, which is simple and cheap to produce and is very effective in operation.

According to the invention, this object is achieved by virtue of the fact that the means for supplying the reducing substances comprise exclusively a vacuum source connected to the outlet passage of the handle for drawing the reducing substances from a supply container connected to the inlet passage towards the aperture of the handle.

The aperture of the handle preferably has a configuration which can be adapted substantially sealingly to the surface to be treated.

According to one preferred embodiment of the invention, the supply container for the reducing substances has in its base a plurality of air-intake apertures with associated regulator valve means, and the outlet passage of the handle is connected to a discharge container which has an outlet aperture connected to a vacuum pump.

Filter members are conveniently associated with the intake apertures of the supply container for achieving a shaking up of the reducing substances by means of the valve and regulating means.

Conveniently, the supply container is provided with electrical means for heating the reducing substances.

Further characteristics and advantages of the present invention will become clear from the detailed description which follows with reference to the appended drawing, provided by way of non-limiting example which shows apparatus for making micro-abrasions according to the invention, in diagrammatic form.

With reference to the drawing, a handle, schematically indicated 1, normally has an anatomically-shaped grip and is provided at one end with an interchangeable head 2 which can assume shapes different from that illustrated, in dependence on the use for which the apparatus is intended. In this instance, the head 2 has an inclined front wall 3 forming

an aperture 4 which is adapted to be positioned, in use, on the surface to be treated.

The aperture 4 communicates at one side with an inlet passage 5 and at the opposite side with an outlet passage 6, and these are connected to respective tubes 7, 8 connected to the handle 1. The inclination of the wall 3, and hence of the aperture 4, to the inlet passage 5 is of the order of 45°.

The tube 8 is connected through an inlet connector 9 to a recovery container 10 having an outlet connector 11 with an associated filter member 12. The outlet connector 11 is connected to an intake tube 13 which is connected to an electric vacuum pump 15 through a vacuum-gauge 14 with a regulator.

The tube 7 is connected to a base connector 16 of a supply container 17 into which a quantity of reducing substances S, normally constituted by abrasive particles of various sizes, is introduced. At rest, the reducing substances S occupy the lower region of the container 17, beneath the mouth of an intake tube 18 which communicates with the base connector 16 and has a hole 28 at its lower end. According to a variant, not illustrated, the intake tube 18 may open outside the container 17.

A passage 19 is situated in the base of the container 17 and communicates with the atmosphere through a valve system, generally indicated 20, including a pair of one-way valves 21, 22 supplied by a solenoid valve 23.

The passage 19 opens into an annular manifold 24 formed in the base of the container 17 and communicating with the interior thereof through a ring of axial holes 25 with associated intake and shaking filters 26.

An electrical resistor 27 is also inserted in the container 17 for heating the reducing substances S.

In use, after the vacuum pump 15 has been activated, the head 2 is applied against the surface to be treated, with the aperture 4 arranged in correspondence with the region on which the micro-abrasions are to be made. The closure of the hole 4 closes the intake circuit and the vacuum generated in the aperture 4 causes the almost hermetic adhesion of the surface to be treated against the edge of the aperture 4. The softer and more resilient the surface, the tighter will be the seal: in the case of human tissue, hermetic adhesion to the edge of the aperture 4 is achieved even with moderate values of the vacuum generated by the vacuum pump 15.

As a result of the vacuum, the reducing substances S held in the container 17 are sucked through the hole 28 together with the air which is drawn through the tube 18, the apertures 25 and the valve unit 20, and reach the aperture 4 under vacuum through the tube 7 and the inlet passage 5. The reducing substances S pass over that region of the surface to be treated which is delimited by the aperture 4, causing micro-abrasions, and reach the container 10

through the outlet connector 6 and the tube 8, being collected therein together with the particles and detritus removed from the surface being treated.

The degree of micro-abrasion caused on the surface under treatment is adjustable by the operation of both the regulator 14 associated with the vacuum pump 15 and the solenoid valve unit 20, whereby the flow of atmospheric air sucked into the container 17 is regulated automatically. Moreover, the air inlet can be closed by means of the valve unit 20 to create a vacuum in the container 17, the readmittance of air through the apertures 25 and the filters 26 effectively shaking up the mass of reducing substances S in the container 17 and thus preventing cavitation.

Naturally, the forms of embodiment and details of construction of the apparatus may be varied widely with respect to those described and illustrated, without thereby departing from the scope of the present invention.

Thus, for example, the vacuum pump could be replaced by equivalent means adapted to create a vacuum in correspondence with the handle.

#### Claims

1. Apparatus for making micro-abrasions, particularly on human tissue and on adherent and non-transpiring bodies in general, including a handle (1) having an inlet passage (5) and an outlet passage (6) which communicate with an aperture (4) provided in the handle (1) and intended to be positioned on the surface to be treated, and means for the metered supply of reducing substances (S) in a pneumatic carrier to the aperture (4) of the handle (1), characterised in that the supply means comprise exclusively a vacuum source (15) connected to the outlet passage (6) of the handle (1) for drawing the reducing substances (S) from a supply container (17) connected to the inlet passage (5) towards the aperture (4) in the handle (1) as a result of the closure of the aperture (4) against the surface to be treated.

2. Apparatus according to Claim 1, characterised in that the aperture (4) of the handle (1) has a configuration which can be adapted substantially sealingly to the surface to be treated.

3. Apparatus according to Claim 2, characterised in that the aperture (4) is inclined at substantially 45° to the inlet passage (5) of the handle (1).

4. Apparatus according to Claim 1 or Claim 2, characterised in that said supply container (17) for the reducing substances (S) has in its base a plurality of air-intake apertures (25) with associated regulation valve means (20), and the outlet passage (6) of the handle (1) is connected to a collecting container (10) which has an outlet aperture (11) connected to a vacuum pump (15).

5. Apparatus according to Claim 3, characterised

in that the intake apertures (25) of the supply container (17) have associated filter members (26) which are adapted to cause a shaking up of the reducing substances (S) by means of the regulation valve means (20).

6. Apparatus according to Claim 3, characterised in that the supply container (17) is provided with electrical means (27) for heating the reducing substances (S).

7. Apparatus according to Claim 1, characterised in that the handle (1) is provided with an interchangeable head (2) which carries the aperture (4).

#### 15 Ansprüche

1. Vorrichtung zur Ausführung von Mikroabschabungen an insbesondere menschlichem Gewebe und anhaftenden, nicht-transpirierenden Gebilden im allgemeinen, umfassend einen Griff (1) mit einem Einlaßkanal (5) und einem Auslaßkanal (6), die mit einer Öffnung (4) in Verbindung stehen, welche im Griff (1) vorgesehen ist und auf die zu behandelnde Fläche gelegt werden soll, und Mittel für die dosierte Zufuhr von abtragenden Materialien (S) in einem pneumatischen Träger zur Öffnung (4) des Griffes (1), dadurch gekennzeichnet, daß die Zuführmittel ausschließlich eine Vakuumquelle (15) umfassen, die mit dem Auslaßkanal (6) des Griffes (1) verbunden ist, um, nach dichtem Verschließen der Öffnung (4) mit der zu behandelnden Fläche, die abtragenden Materialien (S) aus einem mit dem Einlaßkanal (5) verbundenen versorgungsbehälter (17) zur Öffnung (4) im Griff (1) zu befördern.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Öffnung (4) des Griffes (1) so angeordnet ist, daß sie im wesentlichen dichtend der zu behandelnden Fläche angepaßt werden kann.

3. Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß die Öffnung (4) zum Einlaßkanal (5) des Griffes (1) eine Neigung von etwa 45° aufweist.

4. Vorrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß der versorgungsbehälter (17) für die abtragenden Materialien (S) in seinem Boden mehrere Lufteinlaßöffnungen (25) mit zugehörigen Regelventilen (20) aufweist, und der Auslaßkanal (6) des Griffes (1) mit einem sammelbehälter (10) verbunden ist, der eine mit einer Vakuumpumpe (15) verbundene Auslaßöffnung (11) hat.

5. Vorrichtung nach Anspruch 3, dadurch gekennzeichnet, daß den Einlaßöffnungen (25) des versorgungsbehälters (17) filternde Elemente (26) zugeordnet sind, die ein Aufschütteln der abtragenden Materialien (S) mit Hilfe der Regelventile (20) bewirken.

6. Vorrichtung nach Anspruch 3, dadurch gekennzeichnet, daß der versorgungsbehälter (17) mit elektrischen Mitteln (27) zum Erhitzen der abtra-

genden Materialien (S) versehen ist.

7. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß der Griff (1) mit einem austauschbaren Kopf (2) versehen ist, der die Öffnung (4) trägt.

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## Revendications

1. Dispositif pour effectuer des micro-abrasions, en particulier sur du tissu humain et des corps adhérents et non transpirants en général, comprenant une poignée (1) présentant un passage d'entrée (5) et un passage de sortie (6) qui communiquent avec une ouverture (4) prévue dans la poignée (1) et susceptible d'être positionnée sur la surface à traiter, et des moyens d'amenée dosée de substances réductrices (S) dans un transporteur pneumatique, vers l'ouverture (4) de la poignée (1), caractérisé en ce que les moyens d'amenée comprennent exclusivement une source de vide (15) reliée au passage de sortie (6) de la poignée (1), pour extraire les substances réductrices (S) depuis un récipient d'alimentation (17) relié au passage d'entrée (5), en direction de l'ouverture (4) située dans la poignée (1), lorsque l'ouverture (4) est fermée suite à l'application contre la surface à traiter. 10 15 20
2. Dispositif selon la revendication 1, caractérisé en ce que l'ouverture (4) de la poignée (1) présente une configuration lui permettant d'être appliquée de façon pratiquement étanche sur la surface à traiter. 25
3. Dispositif selon la revendication 2, caractérisé en ce que l'ouverture (4) est inclinée à sensiblement 45° par rapport au passage d'entrée (5) de la poignée (1). 30
4. Dispositif selon la revendication 1 ou 2, caractérisé en ce que ledit récipient d'alimentation (17) pour les substances réductrices (S) présente à sa base une pluralité d'ouvertures d'admission d'air (25) avec des moyens de soupapes de régulation (20) associés, et le passage de sortie (6) de la poignée (1) étant relié à un récipient de collecte (10) qui présente une ouverture de sortie (11) reliée à une pompe à vide (15). 35 40
5. Dispositif selon la revendication 3, caractérisé en ce que les ouvertures d'admission (25) du récipient d'alimentation (17) présentent des organes de filtre (26) associés, adaptés pour produire l'agitation des substances réductrices (S) grâce aux moyens de soupape de régulation (20). 45
6. Dispositif selon la revendication 3, caractérisé en ce que le récipient d'alimentation (17) est pourvu de moyens électriques (27) pour chauffer les substances réductrices (S). 50
7. Dispositif selon la revendication 1, caractérisé en ce que la poignée (1) est pourvue d'une tête interchangeable (2) qui porte l'ouverture (4). 55

